Scattering of ^{8}He on ^{208}Pb at 22 MeV

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Abstract. The skin nucleus ^{8}He is investigated by measuring the angular distribution of the elasticly scattered ^{8}He and the ^{6,4}He fragments produced in the collision with a ^{208}Pb target at 22 MeV, just above the Coulomb barrier. The experiment was carried out at SPIRAL/GANIL in 2010. Here we present preliminary results for the elastic scattering.

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INTRODUCTION

The near-barrier scattering of ^{8}He with heavy targets remains still not very well known. Only a few scattering data sets are available nowadays [1, 2]. The skin nucleus ^{8}He presents the largest N-Z asymmetry of the particle-stable nucleus and its particular features makes it an attractive field of study. This work is focused in the experimental results for the elastic scattering up to 95°, for the ^{8}He+^{208}Pb system at 22 MeV.

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EXPERIMENTAL SETUP

The experiment was performed at SPIRAL/GANIL. The experimental setup consisted of a portable reaction chamber where the array of detectors was mounted, a set of collimators and a beam diagnostics system. The detection system, GLORIA (GLObal Reaction Array), consists of 12 DSSSD detectors arranged in 6 particle telescopes (40μm, 1mm) covering a continuous angular range between 15° and 165°.

EXPERIMENTAL RESULTS FOR THE ELASTIC SCATTERING

The experimental results obtained are presented in Fig. 1. The three first telescopes, covering up to 95°, are plotted separately in order to show the existing matching between them. The elastic cross section decreases in a smooth way loosing the Coulomb-nuclear rainbow, characteristic for light stable nuclei.

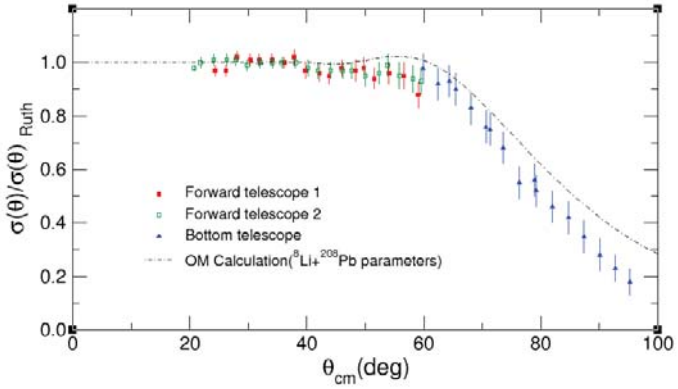

FIGURE 1. Angular distribution of the elastic cross section for the system ^{8}He+^{208}Pb at 22 MeV. The two forward and the bottom telescopes are represented separately.

The experimental data is compared with an OM calculation in which the optical potential derived from the elastic scattering of ^{8}Li+^{208}Pb [3] is used.

CONCLUSIONS

The elastic scattering of ^{8}He+^{208}Pb at 22 MeV has been measured at SPIRAL-GANIL using GLORIA, a new detector developed at the Universtity of Huelva. The angular distribution of the elastic channel decreases in a smooth way loosing the Coulomb-nuclear rainbow.

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